

REMARKS

Claims 1-71 are pending in the present application. Claims 26, 32, 49, and 65 have been amended herein. No new matter has been added.

The Examiner objected to claim 65 because of a typographical error. Claim 65 has been amended to correct the typographical error.

The Examiner has rejected claim 40 under 35 U.S.C. § 112 as being indefinite, specifically that the use of the word “about” leaves the claimed number of threads in the thread pool vague. Applicants respectfully submit that the term “about” has been held to be clear and definite (See MPEP 2173.05(b); *Ex Parte Eastwood*, 163 USPQ 316 (Bd. App. 1968)). It is respectfully requested that the Examiner withdraw the rejection and allow claim 40.

The Examiner rejected claims 41-48 under 35 U.S.C § 102(e) as being anticipated by U.S. Patent No. 6,085,215 (“Ramakrishnan”). Applicants respectfully submit that claim 41-48 are patentable over the art of record for the following reasons.

Independent claim 41 recites:

A method in a computer system for servicing requests from multiple client computers, the method comprising:
monitoring a quantity of work being performed by the computer system;
determining whether the quantity has exceeded an upper limit;
and
if the quantity has exceeded the upper limit but has not dropped below a lower limit, not accepting new requests into the computer system.

Ramakrishnan teaches a scheduling method and apparatus for use in stations of a communications network (Ramakrishnan, col. 4, ll. 9-12). Processing tasks are divided into processing threads, each of which is structured to execute for a limited time before being subject to preemption by another processing thread (Id., col. 4, ll. 17-20). Each processing thread is given a weight that determines how long that processing thread is allowed to run before giving priority to another thread (Id., col. 4, ll. 33-35).

The Examiner states that Ramakrishnan teaches the invention as claimed in claim 41 at column 8 lines 13 through 39, and column 11 line 52 through column 12 line 8 (Office

Action, page 3). Applicant respectfully submits that neither cited portion of Ramakrishnan teaches the invention as shown in claim 41.

Column 8 lines 13 through 39 discusses how a processing task is divided into threads, wherein each thread is then scheduled to run to an intermediate or threshold point before yielding control to a thread scheduler. The time a thread is scheduled to run is determined by calculating a number of units for the thread to process and the thread then relinquishes control to the scheduler thread after the calculated number of units have been processed.

Similarly, column 11 line 52 through column 12 line 8 discusses how latency issues can be considered when determining the weight or number of units assigned to each thread. It also discusses how packet loss can be minimized by creating multiple threads to process each received packet.

At no point do the portions cited by the Examiner teach monitoring a quantity of work of a computer system, determining whether the quantity has exceeded an upper limit, and if the quantity has exceeded the upper limit but has not dropped below a lower limit, not accepting new requests into the computer system, as required by claim 41. It is therefore requested that the Examiner withdraw the rejection and allow claim 41.

Independent claim 45 recites similar limitations as claim 41 and is therefore allowable for the same reasons given above for claim 41. It is therefore requested that the Examiner withdraw the rejection and allow claim 45.

Dependent claims 42-44 and 46-48 all variously depend from claims 41 and 45, and are therefore allowable for at least the reasons given for claims 41 and 45. It is therefore requested the Examiner withdraw the objections and allow claims 42-44 and 46-48.

The Examiner rejected claims 1-8, 38-40, 49-52, 55-56, 58-59, and 65-66 under 35 U.S.C § 103(a) as being unpatentable over U.S. Patent No. 6,457,064 ("Huff") in view of U.S. Patent No. 6,697,835 ("Hanson"). Applicants respectfully submit that claims 1-8, 38-40, 49-52, 55-56, 58-59, and 65-66 are patentable over the art of record for the following reasons.

Independent claim 1 recites:

A method in a computer system for servicing requests from one or more client computers, the method comprising:
receiving a request from a client computer;

a first thread processing the request by invoking a receive handler that creates a work item, wherein the first thread is part of a pool of generic threads;

a second thread performing a task specified in the work item by invoking a work handler, wherein the second thread is part of the pool of generic threads;

receiving a result of performing the task; and

a third thread returning at least a portion of the result to the client computer by invoking a reply handler, wherein the third thread is part of the pool of generic threads.

Huff teaches a method and apparatus for handling an input event directed to a thread within a process operating in a multithreaded system (Huff, abstract). A process is alerted that an input event effecting one of its active connection threads has been received (Id.). An input polling thread in the process is enabled and is used to determine which of the threads in the process has an event directed to it (Id.). That thread is then triggered to handle the event, and the thread is assigned a light weight process to execute the input event (Id.).

Hanson teaches a system where heterogeneous data is accessed automatically in parallel at high speeds from a user site using a script, wherein the heterogeneous data is treated as a single data source object (Hanson, Abstract). A site agent breaks the script into new scripts capable of being executed by remote nodes (Id.). A messenger process then transmits the new scripts to the remote nodes where data can be executed (Id.).

The Examiner admits that Huff does not teach receiving a result of performing the task and a third thread returning at least a portion of the result to the client computer by invoking a reply handler, wherein the third thread is part of the pool of generic threads (Office Action, page 6). However, the Examiner cites to column 6 lines 9 through 54 of Hanson as teaching such limitations. To the contrary, the cited portion of Hanson explicitly refers to a “module of code [that] contains two key NT or Unix threads...a send thread and a receive thread.” (Hanson, col. 6, ll. 11-14). Accordingly, the send thread is not part of the pool of generic threads as required by the claims. In addition, a pool of generic threads is not mentioned anywhere in Hanson. It is therefore requested that the Examiner withdraw the rejection and allow claim 1.

Independent claim 38 recites:

A method in a computer system for servicing requests from one or more client computers, the method comprising:

maintaining a pool of threads, wherein each thread in the pool of threads is identical and can invoke at least one receive handler, at least one work handler, and at least one reply handler;

invoking receive handlers by the threads in response to receiving requests from one or more client computers, wherein the receive handlers create work items that specify tasks to be performed to satisfy the request;

invoicing work handlers by the threads to perform the tasks specified in the work items;

receiving results of the tasks; and

invoking reply handlers by the threads to return at least portions of the results to the client computers.

The Examiner admits that Huff does not teach maintaining a pool of threads, wherein each thread in the pool of threads is identical (Office Action at page 9). However, the Examiner cites column 6 lines 9-54 of Hanson for teaching a pool of identical threads (Id.). To the contrary, the cited portion of Hanson does not teach a pool of identical threads. There is no mention of a pool of identical threads anywhere in the cited portion, in fact, the cited portion refers to a send thread and a receive thread, which are not identical (Hanson, col. 6, ll. 11-14). It is therefore requested that the Examiner withdraw the rejection and allow claim 38.

Independent claims 49, 58, and 65 contain similar limitations to claims 1 and 38, and are therefore allowable for the same reasons given for claims 1 and 38. It is therefore requested that the Examiner withdraw the rejection and allow claims 49, 58, and 65.

Claims 2-8, 39-40, 50-52, 55-56, 59, and 66 are all variously dependent on independent claims 1, 38, 49, 58, and 65, and are therefore at least allowable for the reasons given for the independent claim from which they depend. It is therefore requested that the Examiner withdraw the rejection and allow the claims.

The Examiner rejected claims 9 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Huff in view of Hanson and in further view of U.S. Patent No. 6,665,704 ("Singh"). Applicants respectfully submit that claims 9-10 are patentable over the art of record for the following reasons.

Claims 9 and 10 are variously dependent on claim 1 and are therefore allowable for at least the reasons given for claim 1 with respect to Huff and Hanson. Singh fails to cure the deficiencies of Huff and Hanson.

Singh teaches methods and systems to store a document in a cache while allowing it to be served to multiple concurrent client processes (Singh, col. 3, ll. 49-52). Threads are created that can function as a producer and consumer to retrieve information from a server and send it to multiple clients (Id., col. 3, ll. 52-55). When a thread is retrieving information, it is a consumer, and when a thread is providing data it is a producer (Id., col. 3, ll. 55-60).

Singh does not disclose receiving a result of performing the task and a third thread returning at least a portion of the result to the client computer by invoking a reply handler, wherein the third thread is part of the pool of generic threads, as required by the claims. It is therefore respectfully requested that the Examiner withdraw the rejection and allow claims 9 and 10.

The Examiner rejected claims 11 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Huff in view of Hanson and in further view of U.S. Patent No. 6,327,607 ("Fant"). Applicants respectfully submit that claims 11-12 are patentable over the art of record for the following reasons.

Claims 11 and 12 are variously dependent of claim 1 and are therefore allowable for at least the reasons given for claim 1 with respect to Huff and Hanson. Fant fails to cure the deficiencies of Huff and Hanson.

Fant teaches an invocation architecture for generally concurrent process resolution comprising a plurality of interconnected processors, some of the processors being homogeneous processors and others being special purpose processors (Fant, col. 1, ll. 50-55). Each homogeneous processor is capable of invoking a connected processor to have the connected processor resolve processes (Id., col. 1, ll. 55-57). Each processor is capable of being invoked by a connected processor to resolve processes. (Id., col. 1, ll. 57-60).

Fant does not disclose receiving a result of performing the task and a third thread returning at least a portion of the result to the client computer by invoking a reply handler, wherein the third thread is part of the pool of generic threads, as required by the claim. It is therefore respectfully requested that the Examiner withdraw the rejection and allow claims 11 and 12.

The Examiner rejected claims 13, 63-64, 70, and 71 under 35 U.S.C. § 103(a) as being unpatentable over Huff in view of Hanson and further in view of Ramakrishnan. Applicant respectfully submit that claims 13, 63-64, 70, and 71 are patentable over the prior art of record for the following reasons.

Claims 13, 63-64, 70, and 71 are all variously dependant on claims 1, 58, and 65 and are allowable for at least the reasons given for claims 1, 58, and 65 with respect to Huff and Hanson. Ramakrishnan fails to cure the deficiencies of Huff and Hanson, namely that Ramakrishnan fails to teach a pool of identical threads or receiving a result of performing the task and a third thread returning at least a portion of the result to the client computer by invoking a reply handler, wherein the third thread is part of the pool of generic threads, as required by the claims. It is respectfully submitted that the Examiner withdraw the rejection and allow claims 13, 63-64, 70, and 71.

The Examiner rejected claims 14-16, 18-21, and 25 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of U.S. Patent No. 6,157,927 ("Schaefer"). Applicants respectfully submit that claims 14-16, 18-21, and 25 are patentable over the art of record for the following reasons.

Independent claim 14 recites:

A method in a computer system for servicing requests from multiple client computers, the method comprising:

- receiving a request from a client computer to perform a multi-state function;
- performing a first task, by a first work handler invoked by a first thread in a ready state, wherein the first task is associated with a first state of the multi-state function, and performing the first task includes issuing an asynchronous request for data;
- placing the first thread back in the ready state;
- receiving the data specified in the asynchronous request; and
- performing a second task, by a second work handler invoked by a second thread in the ready state, wherein the second task is associated with a second state of the multi-state function, and the second task performs an operation on the data.

Schaefer teaches methods and apparatuses that enable a component in a transaction processing environment to request, as part of a global transaction that is coordinated in that

environment by a first transaction manager that is not XATMI-compliant, a resource on a remote server outside of that environment that is under the control of an XATMI-compliant transaction manager, implemented in the form of an interconnect (Schaefer, col. 8, ll. 1-15). The interconnect comprises a connection manager and a resource manager (Id., col. 8, ll. 15-17).

The Examiner cites Huff column 4, lines 40 through 58 and column 6, lines 12 through 55 as disclosing receiving a request from a client computer to perform a multi-state function (Office Action, page 19). To the contrary, the cited portion of Huff does not discuss performance of a multi-state function, and nowhere in the cited references does there appear a discussion of performance of a multi-state function. It is therefore requested that the Examiner withdraw the rejection and allow claim 14.

Claims 15-16, 18-21, and 25 are all dependent of claim 14, and are therefore allowable for the same reasons given for claim 14. It is therefore requested that Examiner withdraw the rejections and allow claims 15-16, 18-21, and 25.

The Examiner rejected claims 17 and 22 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of Schaefer and further in view of U.S. Patent No. 6,219,353 ("Wight"). Applicants respectfully submit that claims 17 and 22 are patentable over the art of record for the following reasons.

Claims 17 and 22 are all variously dependant on claim 14 and are allowable for at least the reasons given for claim 14 with respect to Huff and Schaefer. Wight fails to cure the deficiencies of Huff and Schaefer.

Wight teaches a message communication system which performs efficient scheduling of access to a data communication medium by a plurality of nodes connected to the medium using simple signals and circuitry (Wight, col. 1, ll. 60-65). The system features a message hub that operates in a scheduling phase and a transmission phase (Id., col. 1, l. 65-col. 2, l. 1). The system schedules the access of each node to a data communication medium without requiring any special scheduling signal (Id., col. 2, ll. 1-3).

Wight fails to teach receiving a request from a client computer to perform a multi-state function, as required by the claims. It is respectfully submitted that the Examiner withdraw the rejection and allow claims 17 and 22.

The Examiner rejected claims 23 and 24 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of Schaefer and further in view of Hanson. Applicants respectfully submit that claims 23 and 24 are patentable over the art of record for the following reasons.

Claims 23 and 24 are all variously dependant on claim 14 and are allowable for at least the reasons given for claim 14 with respect to Huff and Schaefer. Hanson fails to cure the deficiencies of Huff and Schaefer, namely that Hanson fails to teach receiving a request from a client computer to perform a multi-state function, as required by the claims. It is respectfully submitted that the Examiner withdraw the rejection and allow claims 23 and 24.

The Examiner rejected claims 26-27 and 31-32 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of U.S. Patent No. 6,219,353 ("Wight"). Applicants respectfully submit that claims 26-27 and 31-32 are patentable over the art of record for the following reasons.

Independent claim 26 as amended recites:

A method in a computer system for servicing requests from multiple client computers, the method comprising:

determining that work is available after receiving a request from a client computer, wherein the request from the client computer is a request to perform a function having multiple states;

when work is available, a first work handler invoked by a first thread looking in a first work queue for a first work item corresponding to the work; and

if the first work item is not found in the first work queue, the first work handler looking in a second work queue for the first work item.

Neither Wight nor Huff teach receiving a request to perform a function having multiple states. The concept of a function with multiple states is not mentioned anywhere in the cited art of record. It is therefore requested that the Examiner withdraw the rejection and allow claim 26.

Claims 27, 31, and 32 are all dependent of claim 26, and are therefore allowable for at least the reasons given for claim 26. It is therefore requested that the Examiner withdraw the objections and allow claims 27, 31, and 32.

The Examiner rejected claims 28-30 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of Wight, and in further view of Schaefer. Applicants respectfully submit that claims 28-30 are patentable over the art of record for the following reasons.

Claims 28-30 are all variously dependant on claim 26 and are allowable for at least the reasons given for claim 26 with respect to Huff and Wight. Schaefer fails to cure the deficiencies of Huff and Wight, namely that Schaefer fails to teach receiving a request to perform a function having multiple states, as required by the claims. It is respectfully submitted that the Examiner withdraw the rejection and allow claims 28-30.

The Examiner rejected claim 33 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of U.S. Patent No. 6,026,413 ("Challenger"). Applicants respectfully submit that claim 33 is patentable over the art of record for the following reasons.

Independent claim 33 recites:

A method in a computer system for servicing requests from multiple client computers, the method comprising:
receiving, from a client computer, a request to perform a first task;
evaluating the first task, by a first handler invoked by a first thread, to determine whether the first task includes complex or long-running logic; and
if the first task includes complex or long-running logic, performing the first task by a second handler invoked by a second thread.

Challenger teaches systems and methods for determining how changes in underlying data effect the value of objects (Challenger, col. 3, ll. 8-10). The methods include a method for specifying dependencies between objects and underlying data which allows a computer system to propagate updates to all objects in the system after an underlying data change (Id., col. 3, ll. 23-27). Another method manages relational objects whereby implicit data dependencies between the relational objects are automatically added by the object manager (Id., col. 3, ll. 60-62).

The Examiner admits that Huff does not disclose determining if the first task includes complex or long running logic (Office Action, page 29). However, the Examiner states that Challenger discloses such a limitation at column 30 line 34 through column 33 line 50 (Id.).

To the contrary, the cited portion of Challenger does not disclose determining if the first task includes complex or long running logic, rather the cited portion discloses use of a trigger monitor that itself is a long running process (Challenger, col. 30, ll. 39-42). The trigger monitor as describe in Challenger, does not determine if the first task includes complex or long running logic. It is therefore requested that the Examiner withdraw his objection and allow claim 33.

The Examiner rejected claims 34-35 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of Challenger, and in further view of Wight. Applicants respectfully submit that claims 34-35 are patentable over the art of record for the following reasons.

Claims 34-35 are all variously dependant on claim 33 and are allowable for at least the reasons given for claim 33 with respect to Huff and Challenger. Wight fails to cure the deficiencies of Huff and Challenger, namely that Wight fails to teach determining if the first task includes complex or long running logic, as required by the claims. It is respectfully submitted that the Examiner withdraw the rejection and allow claims 34-35.

The Examiner rejected claim 36 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of Challenger, and in further view of Hanson. Applicants respectfully submit that claim 36 is patentable over the art of record for the following reasons.

Claim 36 is dependant on claim 33 and are allowable for at least the reasons given for claim 33 with respect to Huff and Challenger. Hanson fails to cure the deficiencies of Huff and Challenger, namely that Huff fails to teach determining if the first task includes complex or long running logic, as required by the claim. It is respectfully submitted that the Examiner withdraw the rejection and allow claim 36.

The Examiner rejected claim 37 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of Challenger and Hanson, and in further view of Wight. Applicants respectfully submit that claim 37 is patentable over the art of record for the following reasons.

Claim 37 is dependant on claim 33 and is allowable for at least the reasons given for claim 33 with respect to Huff and Challenger. Wight and Hanson fail to cure the deficiencies of Huff and Challenger, namely that Wight and Hanson fail to teach determining if the first task includes complex or long running logic, as required by the claim. It is respectfully submitted that the Examiner withdraw the rejection and allow claim 37.

The Examiner rejected claims 53-54, 60, and 67 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of Hanson and in further view of Schaefer. Applicants respectfully submit that claims 53-54, 60, and 67 are patentable over the art of record for the following reasons.

Claims 53-54, 60, and 67 are all variously dependant on claims 49, 58, and 65 and are allowable for at least the reasons given for claims 49, 58, and 65 with respect to Huff and Hanson. Schaefer fails to cure the deficiencies of Huff and Hanson, namely that Schaefer fails to teach a pool of threads wherein each thread in the pool of threads is identical. It is respectfully submitted that the Examiner withdraw the rejection and allow claims 53-54, 60, and 67.

The Examiner rejected claims 57, 62, and 69 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of Hanson, and in further view of Challenger. Applicants respectfully submit that claims 57, 62, and 69 are patentable over the art of record for the following reasons.

Claims 57, 62, and 69 are all variously dependant on claims 49, 58, and 65 and are allowable for at least the reasons given for 49, 58, and 65 with respect to Huff and Hanson. Challenger fails to cure the deficiencies of Huff and Hanson, namely that Challenger fails to teach a pool of identical threads, wherein each thread in the pool of threads is identical. It is respectfully submitted that the Examiner withdraw the rejection and allow claims 57, 62, and 69.

The Examiner rejected claims 61 and 68 under 35 U.S.C § 103(a) as being unpatentable over Huff in view of Hanson, and in further view of Wight. Applicants respectfully submit that claims 61 and 68 are patentable over the art of record for the following reasons.

Claims 61 and 68 are all variously dependant on claims 58 and 65 and are allowable for at least the reasons given for claims 58 and 65 with respect to Huff and Hanson. Wight fails to cure the deficiencies of Huff and Hanson, namely that Wight fails to teach a pool of threads, wherein each thread is identical. It is respectfully submitted that the Examiner withdraw the rejection and allow claims 61 and 68.

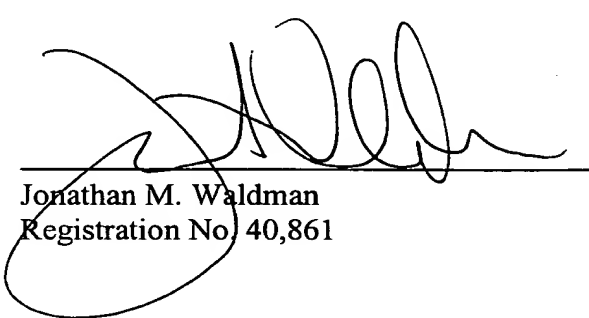
DOCKET NO.: MSFT-0562
Application No.: 09/717,675
Office Action Dated: May 7, 2004

PATENT

CONCLUSION

In view of the above amendment and remarks, Applicants respectfully submit that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested.

Date: August 6, 2004



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